BID DOCUMENT

The Procurement of Equipments

for

Material Science Centre (18 items)
Civil Engineering Department (01 item)

Central Store

National Institute of Technology

Hamirpur, HP (INDIA)

PIN-177005

National Institute of Technology
Hamirpur. (HP) INDIA-177005
Tel: +91-1972- 304040, 304046

Details of Equipment & Tender Cost

S. No.	Name of Equipment	Quantity	Cost of Tender Document (Rs.)	Tender Reference
1.	Micro RAMAN & Photo Luminescence Spectrometer with low temperature attachment	1 No.	1000.00	MSC-1
2.	Optical microscope	1 No.	1000.00	MSC-2
3.	Vacuum coater for metallic thin films	1 No.	1000.00	MSC-3
4.	Zeta sizer	1 No.	1000.00	MSC-4
5.	Laboratory type twin screw extruder	1 No.	1000.00	MSC-5
6.	Scanning probe microscope system (AFM/NSOM/Confocal system)	1 No.	1000.00	MSC-6
7.	Powder X-Ray diffractometer	1 No.	1000.00	MSC-7
8.	Vibrating sample magnetometer integrated with cryogen-free flow temperature system with optional probe to measure resistivity & hall effect, AC susceptibility & specific heat	1 No.	1000.00	MSC-8
9.	Field emission scanning electron microscope (FE-SEM)	1 No.	1000.00	MSC-9
10.	High Energy Planetary Ball Mill	1 No.	1000.00	MSC-10
11.	Impact Tester	1 No.	1000.00	MSC-11
12.	Microhardness Tester	1 No.	1000.00	MSC-12
13.	UV-Visible NIR absorption spectrometer	1 No.	1000.00	MSC-13
14.	Fourier Transform Infrared Spectrometer (FTIR)	1 No.	1000.00	MSC-14
15.	Close cycle refrigerator with cold head for electrical and optical measurements	1 No.	1000.00	MSC-15
16.	Pulsed laser deposition system for thin film deposition	1 No.	1000.00	MSC-16
17.	Vacuum and gas tube furnace (1700 °C) with temperature controller	1 No.	1000.00	MSC-17
18.	Computerised UTM with ±50 KN	1 No.	1000.00	MSC-18
19.	Universal Testing System	1 No.	1000.00	CED-1

1.	**Pre-bid Conference**	**:**	**21st January, 2010 at 14.00 Hrs**
2.	**Last date for sale of Tender Document**	**:**	**1st February, 2010 up to 16.30 Hrs.**
3.	**Last date of submission of Tender**	**:**	**2nd February, 2010 upto 14.30 Hrs.**
3.	**Date and time of Opening bids (Technical)**	**:**	**2nd February, 2010 at 15.00 Hrs.**

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Chapter 1

Invitation for Bids

1. National Institute of Technology Hamirpur, an educational institute under MHRD, Govenment of India, invites sealed tenders for purchase of various items listed in Chapter 4.

2. Prospective bidders are free to demonstrate their products in Material Science Centre / Civil Engineering Department on or before the Pre-bid meeting.

3. The tender documents can be purchased from the Central store; NIT Hamirpur (HP) after depositing requisite non-refundable tender fee (up to 01-02-10 16.30 Hrs) with the cashier, the bidder must attach the proof of having purchased the tender document. The tender document can also be downloaded from the institute website/ tender portal, however, the requisite tender fee in the form of DD/IPO (payable at par) in favour of Registrar NIT Hamirpur (HP), **MUST** be attached with the technical bid. Offers without tender fee shall be considered as rejected.

4. The specifications and other technical details will be finalized/fine-tuned during pre-bid conference after discussion with the prospective vendors. It is desired that all the prospective vendors/bidders attend this pre-bid conference at scheduled date and time in Conference Hall of National Institute of Technology Hamirpur (HP) (hereinafter referred to as The Institute).

5. Important Dates are:

Event	Date	Time
Pre-bid Conference	21.01.10	2.00 PM
Last date of submission of Tender	02.02.10	2.30 PM
Technical bid opening date	02.02.10	3.00 PM

6. The offers costing more than 1 Lakh MUST be accompanied with an Earnest Money Deposit (EMD) @ 2% of the offer price. The EMD may be in the form of DD/FDR drawn in favour of Registrar, NIT Hamirpur (HP), and payable at Hamirpur. The EMD should remain valid for a period of 45 days beyond the final bid validity period.

7. The bidders will have to submit their bids in two parts as under:-

   (a) Technical bid consisting of all technical details along with commercial terms and conditions; and
   (b) Financial/Commercial bid indicating item wise price for the items mentioned in the technical bid.

8. No price information should be included in the Technical bid. Technical Bid should comprise the full technical details and components of the equipment. All products and services asked in the tender should be included. All pages of the quotation should be

numbered as 1 of 10, 2 of 10, and so on for total 10 pages. Each page of the bid and any cuttings/overwritings should bear proper seal and signature of the authorized person of the firm. **Unsigned Tenders shall be rejected**.

9. The technical bid as well as financial bid should be sealed by the bidder in separate covers duly **super scribed** with **bid-title(Technical or Financial), reference number (MSC-1 etc)**. Both these sealed covers are to be put in a **bigger cover** which should also be **sealed and duly super scribed with Tender number/name and due date of tender opening**. The requisite earnest money should be sealed in a separate cover super scribed **EMD.** The duly super scribed sealed bigger cover containing the technical and financial bids must reach on or before tender opening date & time mentioned in the above table, in the office of **Faculty Incharge Purchase, National Institute of Technology Hamirpur, Himachal Pradesh (INDIA), PIN-177005**.

10. Tenders received after scheduled last date and time will not be accepted. Tenders which are submitted without following the Two-bid Offer System will summarily be rejected.

11. Offers must be submitted item wise e.g. sealed offers for MCS-1 and MSC-2 etc. must be put in two different sealed envelopes with different EMD etc.

12. Bid evaluation will be based on the offer(s) submitted by the bidders by the last date. The technical/financial bid therefore must be prepared with utmost care, no conditions or clarifications will be entertained after the opening of the technical/financial bids. However, the indenting department/store may seek justification for any of the components mentioned in the technical/financial bid.

13. The Commercial/Financial Bid should contain:

    i. Price schedule complete in all respects with proper seal and signature of authorized person.
    ii. Prices should be quoted for each item separately.
    iii. The optional items should be clearly specified with budgetary details. Other essential items/accessories required for maintenance of the equipment for the next 5 years may also be specified in the offer separately.
    iv. Comprehensive offer for AMC during post-warranty period should be specified.
    v. Discount offered, if any, should be mentioned clearly in the commercial bid only.
    vi. The Bidders are requested to quote for Educational/Institutional Price for equipment and software etc.

14. The commercial bids will be opened only of the technically qualified bidders. The date of opening of the commercial bids will be displayed on institute website for the information of the qualified bidders, whose representatives can remain present during the opening the technical/commercial bids. The bidders' representatives shall sign an attendance sheet/register as a proof of having attended the meeting. The commercial bids of those bidders who were found technically deficient and do not qualify as per

the tender as adjudged by the indenter/technical committee will be returned without opening, prior to the date of opening of the commercial bids.

15. The bidder must submit an Undertaking to agree to give a security deposit/Performance guarantee amounting to 10% of the purchase order value by of way Demand Draft/Bank Guarantee in favour of the Registrar, NIT Hamirpur (HP), in case of being the successful bidder, from preferably a Nationalized bank. The performance guarantee must be valid for the warrantee period.

16. The bidder must submit an undertaking to agree to demonstrate and install the equipment once received in good condition at NIT Campus within one month of receipt of the consignment at NIT Hamirpur (HP) (hereinafter referred to as INSTITUTE). The bidder shall arrange all desired consumables etc. required at the time of installation/demonstration.

17. The bidder must submit VAT/CST/PAN/TIN etc. Copies allotted by the concerned authority must be submitted along with the technical bid for becoming a responsive bidder.

18. On being considered for supply of equipment/item, the bidder must supply the item(s) with the user and service manual etc.

19. The opinion of the technical evaluation committee shall be guiding factor for technical evaluation/recommendation. Technical committee will have the option to short list firms quoting higher specifications in the tender document.

20. The Institute reserves the right to accept the offer in full or in parts or reject the offer summarily or partly. No clarifications/justification on such decisions shall be given.

21. The bidder must submit a Compliance sheet, as per the format given in the tender document, with any deviation with reference to the terms and specifications.

Chapter 2

Instructions to Bidders

1**. General**

i. The Bidders are requested to go through the tender document, schedule of items, terms and conditions carefully before submitting the bids.
ii. Bidders should quote strictly in accordance with the requirements. The Bidders' conditions printed if any, in the document shall not be binding on INSTITUTE.
iii. Bidders shall adhere to the procedures and processes laid down in this document and shall follow fair and ethical practices of trade.
iv. For branded items, either the OEMs or their authorized distributors/dealers/resellers are eligible to bid. In case of dealers etc., the authorization certificate to this effect, issued by principles should be submitted along with the bid. Offers without such documents shall not be considered.
v. The tenders must be clearly written or typed without any cutting or overwriting.
vi. Merely typing of the specifications displayed/presented in the Tender Document may not make the prospective bidder eligible/responsive for comparison. The specifications mentioned in the offer document must be supported by the catalogue and/or pamphlet.
vii. The makes/brand of items, name and address of the manufacturer, country of origin, and port of shipment, and currency in which rates are quoted are to be mentioned.
viii. Conditional offers will not be accepted in any case.
ix. If more than one model is quoted by the bidders, the model which best suits the specifications will be selected by the indenter/technical committee and the commercial bid of only that model will be taken for comparison of quotations.
x. Based on the list of installations/users provided by the bidder, INSTITUTE will have its option to obtain details of the equipments' working, their performance, after sales service, etc. for evaluation of the tender, directly from the concerned users.
xi. The Institute will have the option to depute a committee to visit any of the past users to assess the working and performance of the equipment quoted by the bidder.

2. **Modification of bids**

i. At any time prior to the deadline for submission of bids, INSTITUTE may, for any reason, whether on its own initiative or in response to the clarification request by a prospective bidder may modify the bid document.
ii. The modifications will be posted on the website of the institute and the bidders are expected to look for any such modifications and these will be binding on them.

3. **Bid preparation**

i. The Tender document must be accompanied by EMD indicated earlier in the form of Demand Draft/ Fixed Deposit Receipt/Bank Guarantee on any Nationalized Bank or Govt. approved banks drawn in favour of Registrar, NIT Hamirpur and payable at Hamirpur (HP). The EMD can be submitted in Indian currency either by the bidder or the Indian agent. No interest is payable on EMD. The EMD will be returned to the bidders whose offer is not accepted by the Institute within two weeks of opening the commercial bids of qualified bidders.

ii. The bid prepared by the bidder, as well as all correspondence and documents relating to the bid exchanged by the bidder and the purchaser shall be written in English language only.
iii. The successful bidder, on award of supply order (SO), must send the order acceptance within 15 days of issue of the SO. The order acknowledgement/acceptance shall be marked on the original purchase order itself, to avoid any dispute/deviation later on.
iv. The EMD of successful bidders will be released within two weeks after installation and submission of security deposit/bank guarantee equivalent to 10% of the order value. The Bank Guarantee must remain valid for the warrantee period.
v. In case of bids in Foreign Currency, the Indian Representative/dealer can submit Security Deposit in Indian Rupees.
vi. EMD shall be forfeited:
    a. If the bidder withdraws the bid during bid validity as in offer document.
    b. In case a successful bidder fails to furnish the Security Deposit/ Performance Guarantee
    c. The bidder fails to:
        i. Supply the equipment as per the SO
        ii. Demonstrate the equipment

4. **Amalgamations, Acquisitions etc.**

In the event of Manufacturer/supplier proposes for amalgamation, acquisition or sale of its business to any firm during the contract period, the Buyer/Successor of the Principal Company are liable for execution of the contract and also fulfillment of contractual obligations, i.e. Supply, installation, commissioning, warranty, maintenance, replacement of parts, supply of spares and accessories as per requirement. An undertaking to this effect should be submitted.

5. **Bid Validity**

i. Bids shall be valid for a period of 90 days from the date of opening the Technical bid.
ii. The INSTITUTE may request the bidder to extend the validity. The bidder is free not to accept the request and in such an eventuality the EMD will be returned to the bidder. A bidder agreeing to the request for extension will not claim any price increase.
iii. Bid evaluation will be based on the technical bid submitted by the due date; no more clarifications will be entertained on the technical specification or prices whatsoever.

6. **Submission of Bids**

i. Bids shall be submitted to the INSTITUTE before the time and date specified in the tender. In case the date happens to be a holiday, the date of submission/opening will be the next immediate working day.
ii. The INSTITUTE may extend the deadline for submission of bids, which will be suitably modified on the website/tender portal.
iii. The INSTITUTE will not be responsible for **late delivery** of tenders. Similarly, tenders received via FAX/e-mail etc. will not be accepted.

7. **Opening of Commercial Bids and Evaluation**

Commercial bids of only short-listed bidders will be opened in presence of the representatives of the bidders who decide to remain present during the bid opening. The date of opening of the commercial bid will be notified on institute website.

8. **Award of Contract**

i. The INSTITUTE shall award the contract to eligible bidder (s) whose bid has been determined as the lowest evaluated bid.

ii. If more than one bidder quotes same lowest price, the INSTITUTE reserves the right to award the contract either to any one or both.

iii. The INSTITUTE reserves the right at the time of the award of contract to increase or decrease the quantity of items specified in the Schedule of requirements without any change in price or other terms and conditions.

iv. Firms which have failed to fulfill various contractual obligations specified in the Tender Document are likely to be rejected and no communication will be entertained in this regard.

9. **Cargo Consolidation and Custom Clearance**

The INSTITUTE has contract with Freight Forwarder and Custom Clearing agent at New Delhi for all imports. Please note that all the consignments (being processed through LC) have to be routed through them for timely clearances. However, the bidders may submit alternatives, if any. The details of the custom clearing agent will be provided with the purchase/supply order.

10. **Corrupt and Fraudulent Practices**

The bidders should exercise highest standards of ethics and fair practices. At any stage, if the Institute comes to know of any fraudulent or corrupt practices, the INSTITUTE reserves the right to cancel the contract at any stage before the delivery of the goods.

11. **Clarifications**

The vendors are informed that they should not call us over phone or contact us in person. All clarifications can be obtained through Post. The Purchaser will respond in writing to any request for clarification, provided that such request is received not later than ten (10) days prior to the deadline for submission of bids.Vendors shall not make attempts to establish unsolicited and unauthorised contact with us after the opening of the offers and prior to the notification of the award. Any attempt by any vendor to bring to bear extraneous pressures on us shall be sufficient reason to disqualify the vendor.

12. **Interpretation of the clauses in the Tender/Contract Document**

In case of dispute/ambiguity in the interpretation of any of the clauses in the Tender Document, the interpretation of Competent authority of The INSTITUTE shall be final.

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Chapter 3

Conditions of the Contract

1. **Price**
   - i. The price quoted shall be considered final and no price escalation will be permitted.
   - ii. In case of foreign currency bids, the price criteria should be on FOB basis.
   - iii. Packaging, forwarding, freight, insurance, commissioning charges, extra, if any, may be quoted separately in commercial bid.
   - iv. In case the quote is Ex-works/FOB based, estimated insurance coverage charges may please be indicated clearly. The consignment of foreign must be CIF New Delhi.
   - v. In case of foreign quote, the mode of dispatch should be by Air Post Parcel/Ocean freight/Air Freight and on Freight to pay basis only. The approximate dimensions of the packages and weight of the consignment are to be indicated.
   - vi. In case of INR bids, the price criteria should be on FOR, NIT Hamirpur (HP). **This Institute is not authorized to furnish C or D forms, but can issue an exemption certificate to avail the concession on Custom duty and excise duty for purchase of scientific goods for educational institution.** The Institute is registered with DSIR vide registration No. TU/V/RG-CDE(311)2006 dated 04.9.2006 (Valid up to 31.8.2011) and exempted from payment of Excise duty vide Govt. Notification No. 10/97 Central Excise dated 1st March 1997 and also exempted from payment of Custom Duty vide Govt. Notification No. 51/96-Customs dated 23rd July 1996.
   - vii. Since the suppliers are requested to quote only on FOB basis, freight, insurance and custom duty as applicable to the Institutes will be paid by the Institute. However, the custom duty payable must be clearly mentioned. Further the bidder will also indicate correctly the rate of customs duty applicable along with Indian Customers Tariff number.
   - viii. The bidder must clearly specify the percentage of tax to be charged, if any, against the offer. Similarly the other levies etc., if any, must be specified in terms of amount or percent. In the absence of such details the prices quoted shall be assumed to be inclusive of all such taxes etc.

2. **Bank Charges**

   All bank charges inside India will be borne by the Institute. All bank charges outside India will be to the sellers account. For all amendments to the contract document, including in L/C, if requested by the beneficiary, the charges will be to the beneficiary's account.

3. **Delivery schedule**

   The bidders may please note that the delivery of the items/equipments should be within three months from the date of placing firm order unless specified otherwise in the terms of the bidder. No extension shall be provided under normal circumstances for the execution of the S.O.

4. **Pre-installation**

   The bidder has to state in detail about the Electrical power/UPS requirements, floor space, foundation needed and also to state whether air-conditioned environment is needed to house the instrument and to run the tests. Such pre-installation requirements

may be mentioned in technical bid. Subsequently, before the equipment is received in the Institute, the bidder shall confirm that the pre-installation requirements are sufficient for installation of the equipment. The bidder should continuously monitor the pre-installation requirements and see that everything is ready before the equipment is taken to the site for installation.

5. **Installation**

i. Bidder shall be responsible for installation/demonstration wherever applicable and for after sale service during the warranty and thereafter.
ii. Installation, demonstration to be arranged by the supplier free of cost and the same is to be done within one month of the arrival of the equipment at site.
iii. Further, the consumables etc. if required during installation have to be arranged and provided by the bidder.

6. **Warranty and Support**

i. The items covered by the schedule of requirement shall carry minimum one year comprehensive warranty (if not specified otherwise) from the date of installation and demonstration of the equipment. Warranty shall include free maintenance of the whole equipment supplied including free replacement of parts. The defects, if any, shall be attended to on immediate basis but in no case any defect should prolong for more than three working days. The comprehensive warranty includes onsite warranty with parts.
ii. The defects, if any, during the warranty period should be rectified free of cost. If this involves import of components, the resulting costs including those of customs, import, transport etc. should be borne by the vendor.
iii. The software upgrades, if any, should be provided free of cost during the warranty period.
iv. The bidder shall assure the supply of spare parts after warranty period towards the maintenance of the equipment if at all required for a period of 5 years from the date of supply of equipment on approved price list basis.
v. The AMC charges after warranty period are to be quoted by the bidders in the Commercial offer. This price could be one of the criteria for arriving at a successful bidder.
vi. Vendor should indemnify, protect and save the Institute against all claims, losses, costs, damages, expenses, action suits and other proceeding, resulting from infringement of any law pertaining to patent, trademark, copyright etc. or such other statutory infringements in respect of all the equipment supplied by him.

7. **Payment**

i. For indigenous items, 90% payment shall be made against installation, demonstration, commissioning and on acceptance of the item as per Supply/Purchase Order at site and balance 10% shall be made after receipt of performance Bank guarantee for 10% of the total order value, which should be valid for the warrantee period. If no Bank Guarantee is given, the balance 10% will be paid after the warranty period, after assessing after sale service during warranty period. The process for release of payment will be initiated only after the receipt of a certificate/report about successful demonstration/installation/training from the department concerned and warrantee certificate from the vendor.

ii. For imported items, 90% payment shall be made by sight draft/irrevocable Letter of Credit (LC) or Telegraphic Transfer (TT) established in favour of the supplier for the order value, against the presentation of shipping documents. Balance 10% will be released after completion of satisfactory installation, commissioning, demonstration of the system, after imparting training and upon receipt of Bank Guarantee (from an Indian Bank) for 10% of the total order value towards performance security to be valid for the warrantee period. However, Letter of Credit/Sight Draft arrangement will be made for 100% of order value.
iii. All bank charges inside India including opening of LC shall be to NIT Hamirpur account whereas all charges outside India to Beneficiary's account only.

8**. Penalty for delays**

i. Delivery period mentioned in the Supply order should be strictly adhered to. Otherwise the bidder will forfeit the EMD and also Liquidity Damage (LD) clause will be enforced.
ii. If the supplier fails to supply, install and commission the system as per the specifications mentioned in the order within the due date, the supplier is liable to pay liquidated damages of 2% of the order value for every week of delay subject to a maximum of 10% beyond the due date.
iii. The Institute reserves the right to cancel the order in case the delay is more than 5 weeks. Penalties, if any, will be deducted from the Security Deposit/EMD.
iv. Disputes, legal matters, court matters, if any, shall be subject to Himachal courts Jurisdiction only

9. **Force Majeure**

The Institute may consider relaxing the penalty and delivery requirements, as specified in this document if and to the extent that the delay in performance or other failure to perform its obligations under the contract is the result of a Force Majeure. Force Majeure is defined as an event of effect that cannot reasonably be anticipated such as acts of God (like earthquakes, floods, storms etc) acts of states, the direct and indirect consequences of wars, hostilities, national emergencies, civil commotion at successful bidder's premises.

10. **Arbitration**

All disputes of any kind arising out of supply, commissioning, acceptance, warranty maintenance etc. shall be referred by either party after issuance of 30 days notice in writing to the other party clearly mentioning the nature of dispute to a single arbitrator acceptable to both the parties. The venue for arbitration shall be NIT Hamirpur (HP).

SPECIAL CONDITIONS OF THE TENDER

1. Offers should be submitted along with catalogues, illustrated pamphlets, detailed specifications and also outlines and dimensioned drawings wherever necessary. As the descriptions given against the items in the schedules are only indicative of the types of the machinery and equipment required for use in laboratories etc. particulars with regard to the brand, type and the manufacturer's name should be clearly stated against the offers.
2. The origin of the items of equipment whether 'Indian' or 'Foreign' etc. should also be given against the offers. Every supply should be accompanied with a "Quality

Assurance Certificate" (QAC) indicating that the goods so supplied are in conformity with the specifications given in purchase order.

3. Post tender negotiations will be in exceptional cases with the L-1 bidder only. You are therefore requested to submit your best quote at the initial stage itself.
4. When the items offered do not conform to the specifications listed in the schedules, full particulars of the deviations should be clearly indicated against the items with a remark "Alternatives". Tenderers should also state if any additional equipment & necessary to ensure completeness of the equipment and should also quote for such additions separately.
5. The tenderers should verify and make sure that the claims made by them against items towards Sales tax, customs duty, excise duty etc., are not more than those permissible under the provisions of the laws in force, and that they will refund any excess claims admitted in this respect.
6. The offers should be kept open for a period of 90 days from the date of opening of tenders. Acceptance of the offers will be intimated to the successful tenderers within that period. Tenderers will however, be given the option to keep their offers open for a further agreed period if there be any delay in intimating the acceptance.
7. The suppliers should repair or replace free of charge any defective machinery or parts etc. supplied by them due to faulty design, defective materials or workmanship or any other reasons whatsoever within the warrantee period.
8. Should the tenderer fail to supply the equipment ordered within the period prescribed or in case the equipment supplied is not in accordance with the specifications accepted against the offer, the INSTITUTE, at its discretion and option, may order such similar equipment on any other firm offering the same, the EMD of the defaulter in such a case shall stand forfeited.
9. The decision of the INSTITUTE shall be final as regards the acceptability of the equipment supplied by the tenderers and the Institute shall not be required to give any reason whatsoever for rejecting any equipment.
10. With every delivery of equipment under the contract, invoices in triplicate containing the reference of purchase order and date should be sent by the supplier to the INSTITUTE.
11. Conditional offers, supplies, and bills in contravention to the terms contained herein and in the purchase order shall not be accepted.
12. The date mentioned in the purchase order for arranging supplies should be construed as the date on or before which supplies should reach the INSTITUTE and should not be taken as the date for dispatching stores.

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Chapter 4

Schedule of Requirements

S. No. of Item	Equipment name	Number or Quantity
1.	Micro RAMAN & Photo Luminescence Spectrometer with low temperature attachment	1 No.
2.	Optical microscope	1 No.
3.	Vacuum coater for metallic thin films	1 No.
4.	Zeta sizer	1 No.
5.	Laboratory type twin screw extruder	1 No.
6.	Scanning probe microscope system (AFM/NSOM/Confocal system)	1 No.
7.	Powder X-Ray diffractometer	1 No.
8.	Vibrating sample magnetometer integrated with cryogen-free flow temperature system with optional probe to measure resistivity & hall effect, AC susceptibility & specific heat	1 No.
9.	Field emission scanning electron microscope (FE-SEM)	1 No.
10.	High Energy Planetary Ball Mill	1 No.
11.	Impact Tester	1 No.
12.	Microhardness Tester	1 No.
13.	UV-Visible NIR absorption spectrometer	1 No.
14.	Fourier Transform Infrared Spectrometer (FTIR)	1 No.
15.	Close cycle refrigerator with cold head for electrical and optical measurements	1 No.
16.	Pulsed laser deposition system for thin film deposition	1 No.
17.	Vacuum and gas tube furnace (1700 C) with temperature controller	1 No.
18.	Computerised UTM with ±50 KN	1 No.
19.	Universal Testing System	1 No.

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Chapter 5

Specifications and allied technical details

NOTE :-

1. Operation, maintenance & product manual (at least 4 copies) to be supplied by vendors with each equipment at the time of demonstration.
2. Calibration as per international/national standards of the quoted equipments for first 3 years from the day of installation and commissioning of equipment to be provided by the vendors.
3. The vendors will have to provide training on their safe operation pertaining to their equipments to Technical staff at NIT Hamirpur (HP).

No. of Item	Name of the instrument
MSC-1	**Micro RAMAN & Photo Luminescence Spectrometer with low temperature attachment** • Automated Raman mapping and imaging. • Confocal Raman microscope. • Micro and macro sampling. • Multiple laser excitations from UV to near IR (325nm, 442nm HeCd, 514nm Ar and 748nm) • Detector should be capable of measuring signal under all excitation mentioned above with resolution of 0.1 cm^{-1} or better. • Accessories for low temperature measurements (10K-300K). • Rayleigh rejection filters till 30 cm^{-1} or below. • Set up for photoluminescence measurements. **Tool kit and spares for three years.** **Installation and free training to three to four persons for two weeks at the installation site (NIT, Hamirpur) for smooth operation.** **Warranty of three years.**
MSC -2	**Optical microscope** • Table top version • Objective change . manually via 5-position nosepiece • Magnification values of objective lenses are 4x, 5x, 10x, 20x, 40x, 50x 100x • Magnification of eyepieces include 4x, 5x, 10x, 20x, 40x, 50x 100x • Sturdy mechanical X-Y, fixed or gliding stages with low position controls (left or right) • Unique Infinity Color-Corrected System (ICS) optics • Halogen, Mercury or Xenon light sources available • Working Permissible ambient temperature -40 to +60 °C • Electrical safety • Radio interference suppression. • Manual stage -----fixed stage/glide • Axion stage from -40- +60 C • Stage focusing--------. coaxial coarse/fine drive • Coarse drive: 1 rotation = 4 mm

	• Fine drive: 1:10 step-down ratio • Maximum field of view-----20 mm • Maximum object field ------- 8 mm **Must have compatibility/connectivity with PC/Laptop through software, if required**
MSC -3	**Vacuum coater for metallic thin films :** Vacuum Chamber : Beljar Type Chamber Size : 300 mm Dia × 350 mm Height (nominal) Material : Stainless Steel – SS 304 Base Plate : SS304, 330 mm dia, with 11 nos. ports for various feed throughs Chamber Lifting :Manual lifting with spring & ball cage assembly Chamber Gadgetories: (std) a. Work holder size (stationery) : 225 mm dia b. LT Evaporation : 3 sets × 200 amps., 10 V. A. C. (Sequeintial) c. Ion Bombardment : 1 set, 3.5 KV, 50 MA D.C. d. Source Shutter (manual) : 1 set Vacuum Pumping System a. Turbo Pump : 260 Lit/sec b. Rotary Vacuum Pump : 250 Lit/sec c. High Vacuum Valve : 100 mm Butterfly Valve d. Roughing, Backing Valve : 25 mm size e. Vacuum Gauges : Analog, Pirani, Penning Gauge with sensor to measure vacuum in the range of atmosphere to 1×10^{-3} mbar and 10^{-3} to 10^{-6} mbar Ultimate Vacuum : 1×10^{-6} mbar Utilities Required Power : 230 V AC, 50 Hz, Single Phase, 15 Amps Free installation and training to 2-3 persons at the installation site (NIT Hamirpur) Warranty of three years
MSC -4	**Zeta sizer** • Light scattering techniques based instrument. • The system should have temperature control, giving control over the range 2°C to 90°C. • The optics must be fully pre-aligned with no user adjustment required. • The system must use an avalanche photodiode detector to maximize the concentration sensitivity of the system. • The maximum allowable sample concentration must be 40% by weight for sizing applications. • The position of the sampling volume within the measurement cell must be variable, with both automatic and manual control. • The system must utilize a backscattering arrangement .

	• The system must have a minimum sample concentration value of 0.1 mg/mL lysozyme or 0.1 ppm for sizing applications. • There must be the option available to upgrade the internal laser with an internally fitted 50mW 532nm laser. **Particle size** measurement of molecules from 0.6nm to 6 microns. **Zeta potential** - in aqueous and non-aqueous dispersions **Molecular weight** 1000 - $2x10^7$ Da
MSC-5	**Laboratory type twin screw extruder :** Purpose : To make polymer nanocomposites/composites samples in the laboratory; should be able work with small amounts of materials Screw Design : Parallel co-rotating segmented/counter rotating Modular , two lobes with dosing and venting openings Screw Diameter : 16-20 mm L/D : 25-40 Maximum temperature : 400-450˚C Maximum permissible inner pressure : 150-200 bar Number of Heating Zones (barrel & die) : 4 (min.) Control Thermocouples : 4 (min) Screw rpm : 1200 (max) Maximum torque : 70 – 160 Nm Power supply : 220/240 V, 50/60 Hz Motor : AC motor 4 KW (single phase) Optional : Gravimetric Multistrand Die Pressure Transducer
MSC-6	**Scanning probe microscope system (AFM/NSOM/Confocal system) :** **Standard Modes:** **STM:** low current STM (for poorly conducting samples; with tunneling currents in the range of pico amperes. This module should have three bandwidth ranges covering 400 Hz to 4 KHz. This accessory should be able to achieve very high quality atomic resolutions STM scans. Scanning Tunneling spectroscopy (STS: I-V, I-S). **AFM:** Contact, non-contact, AC / tapping mode, quantitative phase imaging with a suitable electronics module (with lock in amplifier), Lateral Force Microscope (LFM), Magnetic Force Microscope (MFM), Electric Force Microscope (EFM), Liquid Cell (Contact, AC / tapping, force modulation (in air and fluid). Force-Distance curve for contact mode with force detection capability. In non-contact, AC/Tapping mode amplitude-distance curve measurement facility. **Sample Size:** Ranging from: 10 mm x 10mm x 3 mm (Minimum) to 50 mm x 50mm x 3 mm (Maximum) **Electronics:** BNC connectors for measurement on CRO of tunneling current, feedback output which goes to piezo, detector output etc. DAC / ADC card should be at least 20-bit. **Positioning Stage:** Manual and automatic positioning stage **Scanner Range:** ≤ 1μmX1μmX0.7μm, 10μmX10μmX3μm 40μmX40μmX20μm, 80μmX80μmX5μm or greater **Noise level/ Resolution:** < 0.3 Å RMS in z-direction, Atomic resolution on HOPG and Mica **Optical Microscope:** Magnification ~50 X or better

CCD: Color CCD camera for vertical view of tip and sample, Resolution ~ 1 μm
Standard samples for calibration: Mica, HOPG, SrTiO3, Gold film on silicon, Square and linear grating (up to 1 μm and 10 μm).
Optional Modes:
Dual Scanner AFM/NSOM/CONFCAL System
Dual tip and sample scanning at the same time.
Top Plate Tip Scanner
Bottom Plate Sample Scanner
Feed Back Mechanism – Tuning Fork
NSOM/AFM/Confocal microscope head with ability to be placed on the stage of any upright or inverted optical microscope allowing for a completely free optical axis from the top and the bottom of the NSOM and AFM probe.
Cantilevered optical fiber probes providing normal force sensing.
Ability to use conventional AFM type silicon cantilevers with the system
both NSOM and AFM, AC operating modes.
Ability to work in reflection, transmission and collection modes.
7 mm high 3D Flat Scanning stage with central aperture enabling clear vertical axis for placement of microscope lenses from above or below.
High resolution scanning with 140 micron maximum scan range in x and y directions as well as 140 microns maximum of z direction scanning.
Use of ultra long AFM probes for deep trench imaging applications
Rough travel over a range of 6 millimeters with 1 micron step movement
Ability to perform TERS (TIP ENHANCED RAMAN SPECTROSCOPY) imaging
Ability to be integrated onto the stages of confocal beam scanning microscope systems
Ability to be integrated into large sample SEM chambers
Controller – Upto 8 data channels can be read & imaged simultaneously
16bit ADCs & 16bit DACs
Image size continuously variable from 2x2 to 1024x1024
2D & 3D image rendering
Ability to be housed in controlled environmental chamber with full optical access and integration onto the stage of optical microscopes.
Ability to provide chemical delivery or liquids and gases with Fountain Pen nano-pipettes.

NANO INDENTER (Stand Alone Unit)
Load Range : 0.1 - 500 mN
Load Resolution : 0.04 μN
Maximum Depth : 200 μm
Depth Resolution : 0.04 nm
Sinus Mode Analysis (DYNAMIC MICRO HARDNESS ANALYSIS): 20 Hz
Load rate : up to 10 N/min
XY Stage : 120 x 20 mm
XY Resolution : 0.25 μm
Video Microscope Magnification : 200x, 4000x
Video Microscope Camera : Color 768 x 582
Surface Referencing for

- High Accuracy of Depth Measurement
- Rapid Measurement Cycle Time
- Negligible Thermal Drift
- Protection of Measurement tip from Mechanical Damage

Continuous Multi Cycle (CMC) for:

- Indentation Hardness, Elastic Modulus & Stiffness to be obtained as function of Depth
- Very High throughput & reproducibility
- Automated Optical Microscopic Inspection
- Creep, Fatigue & Fracture Toughness Test

Complete S/w Package:

- Real time display of force against depth, with automatic calculation of hardness and elastic modulus.
- Powerful indentation modes including Sinus (DMA),CMC™, large area mapping
- Programmable system settings for every single indent in a multi indent experiment
- Fully customized user access rights management
- Super positioning of data curves
- Multi language support
- Two external user channels available
- Automatic measurement report generator
- Powerful measurement statistics module
- Data export in ASCII format
- Easy video capture and measurement

Vibration Isolation Platform

Ultra Low Noise Platform SPM combination

Computer/ Server, Software

State of the art automation with computer (Microsoft/ Linux compatible), controller, data acquisition and image processing software (on latest operating system which should be up gradable up to 5 years). Data image import and export among all standard formats e.g. ASCII, TIFF, JPEG, BMP etc. Two color monitors (one for control and other for imaging)

Image Processing software Section analysis, roughness analysis, depth analysis, power density analysis, 2D/3D FFT, histogram analysis, grain size analyzer.

Heating and cooling facility Temperature range: –25 °C to 250 °C (variable temperature option if any may also be quoted)

Expandability: Latest SPM controller with additional features like Q control. AFM should be expandable to nano indentation / scratching, Scanning Thermal, Scanning Capacitor Microscopy, nanolithography and nano-manipulation.

Electrical requirements:220- 240V, Single Phase, 50 Hz (If not providing 220-240 V, converter should be supplied)

Accessories

Tips for STM (Pt-Ir):
AFM Cantilevers: (Contact, non-contact and magnetic 50 each)
Sample holders: 4 Nos.
Tip and cantilever holders: 2 Nos each.

Tip evaluation Package

For different modes Standard samples to be quoted.
Latest SPM controller with additional features like Q control, fast scanning with micro

	actuator processor The following items may be quoted stand alone or along with standard system 1. Near Field Scanning Optical Microscopy with Transmission, Reflection, Collection and Fluorescence mode (with liquid cell) Confocal Microscopy with transmission, Reflection and Flurorescence **Power supply** Mains supply is 230 V (– 10%, + 6 %) AC, 50/60 Hz; Additional accessories if required for the proper operation of the System should be quoted. Tool kit and spares for three years Warranty of 3 years. Installation and training of three to four persons for two weeks at the site (NIT Hamirpur) for smooth operation of the machine.
MSC -7	**Powder X-Ray diffractometer :** 1. X-ray Generator: a. Maximum rated output: 3kW b. Rated tube voltage : 20-50 kV in step of 2 kV c. Rated tube current : 10-60 mA in step of 2 mA d. X-ray tube : Copper and Mo targets 2. Goniometer: Theeta-2theeta type high resolution goniometer with step width of 0.0001 degree; Capable of being operated in coupled and decoupled modes; Sample mounting horizontal, multi sample holder; Diffracted beam focusing type with automatic changer crystal analyzer; Slits with various sizes (1/2°, 1° and 2°); Microprocessor based controller for goniometer control. 3. Detector: NaI detector with electronics compatible to high dynamic range. 4. Thin film attachments (glancing angle mode) 5. Suitable water chilling system for continuous operation. 6. With all necessary alignment kits and circuit diagram. 7. Latest computer with Window XP Software LCD Monitor 19" SVGA color. 8. Standard software for control alignment and data processing. Warranty of 3 years. Installation and training of three to four persons for two weeks at the site (NIT Hamirpur) for smooth operation of the machine.
MSC -8	**Vibrating sample magnetometer integrated with cryogen- free flow temperature system with optional probe to measure resistivity & hall effect, AC susceptibility & specific heat** Manufacturing, supply, installation/commissioning of a Vibrating Sample Magnetometer for dc magnetization measurements with integrated cryogen-free low temperature system with following specifications. **(System should operate and start without LHe and LN_2).** **Maximum field 7 Tesla** Field uniformity ~ 0.1% over 3 cm. Sensitivity 10^{-6} e.m.u. Residual field < 1G Temperature range 1.5 K to 400K High Temperature option up to 1000K

	Additional optional probes: Magneto-resistance and Hall effect probe AC susceptibility Specific heat measurements probe Please quote the additional probe price + basic system price. Tool kit and spares for three years. Installation and free training to three to four persons for two weeks at the installation site (NIT, Hamirpur) for smooth operation. Warranty of three years
MSC -9	**Field emission scanning electron microscope (FE-SEM)** We are in the process to purchase of FE-SEM to study the surface morphology of various materials such as ceramics, thin films, metallic alloys, soft materials (polymers and their composites). The detailed specifications of the required FE-SEM are given below: 1. Resolution: 3nm @30 kV 2. Magnifications: 5X to 1,000,000X 3. Accelerating Voltage: 0.5 kV to 30 kV 4. Chamber: diameter=420mm; height = 330mm 5. Specimen stage: X= 130mm; Y= 130mm; Z= 50mm Tilt angle = 0-90 degree; Rotation = 360 degree 6. Maximum specimen height : 210 mm 7. Detection system : SE Detector and BSE detectror 8. Vacuum system: low and high with automatic control 9. System with EDX attachment with Si(Li) detector or Pelletier cooled detector. 10. Sputter coater 11. Includes essential spares, tool kit Installation and training of three to four persons for period of two weeks at on site (NIT Hamirpur). Warranty of three years.
MSC-10	**High Energy Planetary Ball Mill** Type :High Energy Planetary Ball Mill Purpose :For grinding and mixing ceramic materials like alumina, boron carbide, aluminium nitride, etc. No. of Sample Holders : 4 nos. on rotating table Table Speed : 40 – 400 rpm continuously variable Timer : 1 – 999 min. with time setting programme facility Indicator for : Plate speed, bowl speed, set time, balance time Power Supply : 230 V AC, 50 Hz Bowl and Ball Specifications : As below Warranty Period Required : 2 years from the date of commissioning

	Type I Materials for bowl, lid and ball : Tungsten carbide No. of bowls with lid : 2 Nos. Volume of each bowl : 250 ml Diameter and number of balls: (i) 10 mm diameter – 200 nos. (ii) 8 mm diameter – 100 nos. ***Type II*** Materials for bowl, lid and boll : Stainless steel No of bowls with lid : 2 nos. Volume of each bowl : 500 ml Diameter and number of balls: (i) 10 mm diameter – 200 noss (ii) 8 mm diameter – 100 nos.
MSC-11	**Impact Tester** Test Modes : Instrumented Falling Weight Impact, Charpy and Izod Velocity : 1 to 7 m/sec Energy : 500 J at 1050 kPa Force : Standard range 50 kN Sampling Rate : 62500 /sec, resolution 16 bit Displacement : Optical Strip Sensor Timing Resolution : 0.5 microsecond Temperature : -44^{o}C to 100^{o}C Air Supply : 400 kPa to 1050 kPa clean air Air Consumption : 0.5 Litre for each test Results : Force-Displacement and Velocity-Displacement curves Data : F_{peak}, E_{peak}, $X_{peak,}$ F_{break}, E_{break}, X_{break}
MSC-12	**Microhardness Tester** • Magnifications of the measuring system: 500X, 125X • Min. scale value of measuring microscope: 0.025m • Max. Height of test piece: 75mm • Measuring range: 5-3000HV •Test force: 0.09807, 0.2452, 0.4904, 0.9807, 1.961, 2.942, 4.904, 9.807N • Depth of throat: 100mm • Power supply: 220V AC **For nano-materials**

Specifications of the Micro Hardness Tester	
Load Range	0.04 - 40N
Load Resolution	0.4 mN
Penetration of Depth	500 µm
Depth Resolution	10 nm
X Stage	100 mm
Z Maximum Clearance	90 mm
X,Y Lateral Resolution	0.15 µm
Base Dimensions	42 x 53 x 64 cm

<table>
<tr><td></td><td>
<table>
<tr><td>Video Microscope Magnification (Standard)</td><td>50x, 200x, 500x</td></tr>
<tr><td>Video Microscope Magnification (Optional)</td><td>100x, 1000x</td></tr>
</table>
</td></tr>
<tr><td>MSC-13</td><td>UV-Visible NIR absorption spectrometer
Optical system: Double beam
Wavelength range: 190 to 2000 nm
Spectral bandpass: 1.5nm
Display U-2900: color LCD with backlight (26.4cm)
Resolution: 0.1 nm or better
Accessories for measurements in reflection geometry
Printer I/F U-2900: Centronics interface
Serial I/F RS-232C (exclusive for UV Solutions program)
Power supply 100, 115, 220, 230 or 240V, 50/60Hz
Tool kit and spares
Installation and free training to three to four persons for two weeks at the installation site (NIT, Hamirpur) for smooth operation.

Warranty of three years.</td></tr>
<tr><td>MSC-14</td><td>Fourier Transform Infrared Spectrometer (FTIR)

• Please quote the FTIR system with following specifications:
• Range : 4000 - 350 cm^{-1}
• Resolution : Better than 1 cm^{-1}
• Self-compensating DynascanTM interferometer
• Sealed and desiccated Germanium-coated KBr optics
• Integrated local control, including spill-resistant QWERTY keypad
• Vibration-isolated table.
• Spill-resistant QWERTY keypad with single-keystroke operation allows easier data-handling
• Sealed and desiccated optics protect moisture-sensitive components and dramatically remove the effects of change of atmospheric absorptions from spectra
• All data and spectra are displayed in color using a custom palette
• Software for data acquisition and analysis
• Accessories for reflection mode
• Tool kit and spares
Installation and free training to three to four persons for two weeks at the installation site (NIT, Hamirpur) for smooth operation.

Warranty of three years.</td></tr>
<tr><td>MSC-15</td><td>Close cycle refrigerator with cold head for electrical and optical measurements

Provide the quotation for close cycle refrigerator with following specification:
• Temperature range 10K-300K single stroke/double stroke
• Cold head for electrical transport and optical measurements.</td></tr>
</table>

	• Sample stage heating arrangement with controlled fashion. (The temperature controller will be provided.) • Rotaroy Pump to evacuate the sample chamber. Free Installation and testing of the system. Warranty for three years
MSC-16	**Pulsed laser deposition system for thin film deposition** **Laser Source:** KrF Excimer, 248 nm wavelength (pulse duration 20 ns) **Chamber:** Multi-target deposition chamber with substrate heating upto 830 C. Maximum vacuum $1x10^{-6}$ torr. With trubo-molecular pump, roughing and backing by rotary pump, throttling gate valve, gauges with controller. Also include gas handling system for partial pressure of gasses. The system should be capable for materials for research purpose with wide range of options such as (such as various oxides of CMR, ferrites, high Tc, multi-ferric; nitrides, carbides, GaAs, Heusler alloys etc.) from thin film point of view. Laser Table, gas kits. Chiller of cold water Tool kits and spares for three years. Installation and free training to three to four persons for two weeks at the installation site (NIT, Hamirpur) for smooth operation. Warranty of three years.
MSC-17	**Vacuum and gas tube furnace (1700 °C) with temperature controller** Maximum Operating Temperature : 1700˚C without vacuum but with inert gas Maximum Continuous Operating Temperature : 1600˚C Furnace Casing : Double layer steel structure with air cooling fan to keep case temperature below 55˚C Temperature Control : PID automatic control via SCR (Silicon Controlled Rectifier) power control, e.g. current limiting angle fired the resistor with 51 steps programmable) Heating/Cooling Rate : 5˚C / min. Temperature Accuracy & Stability : ±1˚C Heating Element : $MoSi_2$ Net weight : 150 kg Tube Materials : High purity Al_2O_3 ceramic Processing Tube : Premier grade alumina tube, ID: 50 mm × OD: 60 mm × 1000 mm length Install two pairs of SS tube support To avoid tube bending under

		high temperature
	Seal Flanges	: One pair of sealing flange with double silicone high temperature O-ring Two SS needle valves and one dial Vacuum gauge should be installed Vacuum pressure upto 10^{-3} torr by rotaroy vacuum pump and above 10^{-3} torr by diffusion pump
	Heating Zone	: 457 mm
	Constant Temperature Zone	: 150 mm
	Input	: Single Phase, 220 V AC, 50/60 Hz
	Output	: 5 KW
MSC-18	**Computerised UTM with ±50 KN** The ± 50 kN capacity computer controlled universal testing machine should have the following features **Basic Frame** • Frame should have 4 columns, 2 stiffness bars and 2 lead screws, precision aligned load frame, floor mounted ensuring highest level of lateral stiffness. • pre-loaded ballscrew drive for back lash elemination and crosshead guidance with reverse stress testing • Digital crosshead drive system with fully variable speed control • Position Measurement Accuracy: ± 0.02 mm or ± 0.05% of displacement (whichever is greater) • Testing speed range: 0.001 to 500 mm/min • Stiffness of the load frame should be more than 250kN/mm • Position Control Resolution: 0.070 μ m or better • Crosshead Speed Accuracy (Zero or Constant load): ± 0.1% of set speed • Specimen protection to ensure premature specimen failure while gripping. **Electronics** • Digital Signal Processor, with 32 bit-floating point, downloadable firmware, self test diagnostic, Real time system status, Real time close loop control and Real time data acquisition • Data collection : 40 kHz sampling rate with 500 points per sec (2mSec) synchronous data logging on channels such as Load, Position, Stress, Strain, Elongation, Modulus. ▪ The system Resolution to be 1/500,000, When 50kN Load cell connected. **Data transfer to PC through high speed digilink link with transfer rate750 Kbaud to capture quick changes in points for plotting Graph's real time** • Data display: up to four channels real-time data simultaneously on PC screen Facility for a control panel with start, stop and return functions, programmable function keys. • The controller should be able to recognize and calibrate the transducers (Load, Strain and position) automatically. • Provision to set limits of each transducer. • Provision to tap load, strain and displacement signals to an external recorder. **Load Cell** Strain gauge type Tension/Compression Load Cell with web shear design	

	A) 50 kN Load cell with range from 0.4% to Full scale. Overload Protection upto 160% without drift and 300% overload without mechanical damage. Load Measurement Accuracy: ± 0.4% of reading down to 1/100 of load cell capacity, ± 0.5% of reading down to 1/250 of load cell capacity Automatic recognition and calibration of transducer Drive: High Torque DC servo amplitude motor with digital closed loop position controller. Suitable for 230 +/- 10V single phase, 50 +/- 2 HZ operation. **Grips:** 50 kN capacity Wedge Action grips of rated capacity 50 kN to accommodate flat as well as cylindrical specimens of varied sizes {Specimen dimensions (Max): thickness: 12 mm, width: 25mm, diameter: 3.0 -12.5 mm} **Materials Testing Software:** Equipment will run through basic software & Hardware **Tension Test Application Package** The software should have facilities for pre-cycling, pre-loading, up to three test ramps with automatic changeover at user specified values, hysteresis reversal, selectable control modes and test end/break detection control. Available test results and calculations should include tensile, compressive strength, flexural, K_{IC} , non-proportional elongation, "r" and "n", modulus, yield, break, pre-set point detection, peak values, reduction in area and yield point elongation (YPE) **Bend Test** Rigid Coupling. Rated capacity 50 kN with threaded end fitting accessory Flexure Fixture, 3 point Bend, Capacity: 50 kN Span : 30 - 250 mm with upper and lower fittings Temperature Range : -100°C to +350°C Upper anvil : 10 mm diameter Lower anvil : 10 mm diameter **Compression Anvils** 150 mm diameter Compression Anvil, 50 kN capacity
CED-1	**Universal Testing System** Specifications/Requirement • Universal Testing System shall have electronic measuring system comprising of one each 50,000 N, 5000N and 500 N capacity load cells and a two channel 3 ½ digit indicator. The 50,000 N capacity system must have speed ranging from 0.1 to 500 mm/min. Provision to apply cyclic loading up to 10000 cycles shall also be provided with the universal testing system. The equipment shall have the following detailed specifications. • Capacity 5T • Number of Ball Screws two • Column Spacing 800 mm or higher • Speed Range 0.1 to 500 mm/min or better

	• Cross head Speed Accuracy ± 1% of indicated speed • Throat Depth 100 mm or higher • Vertical Day light 1000 mm or higher • Height 1500 mm or higher • Width 826 mm or higher • Depth 500 mm or higher • Voltage 220V AC 50 Hz • Load measurement accuracy 0.5 % or better • Load measurement resolution 1:6500 or higher • Cross Head Travel 960 mm or higher • Position control resolution ±0.01 mm or better • Positional Accuracy ±0.05 mm or better • Software compatible with WINDOWS XP/VISTA for digital display of load/length/speed/graphs shall be provided on CD. • Communication with test stand via RS 232 port or USB Port • Data Acquisition Speed 200 Hz or better • Data Output LPT1 (Printer Port) • ASCII file (Export to Microsoft Excel spread sheet) • Laser Printer: Laser printer with driver on CD, all accessories and meeting the following specifications, • Black print speed Up to 19 ppm, Black print resolution Up to 1200 x 1200 dpi, Print technology REt, FastRes 1200, Printer memory 8 MB, Processor 266 MHz RISC, Paper handling 10-sheet priority feed slot, 250-sheet input tray for A4 size paper, Connectivity 1 USB, Supported operating systems Windows XP Professional or Windows Vista • The following attachments shall be supplied with the equipment. • Narrow and Wide width Tensile Strength • The equipment shall have two roller grips. One for narrow strip strength and one for wide width tensile strength. These grips shall be as per many international specifications viz. Indian, British, ASTM etc. The grips shall allow simple and rapid sample loading.

	• Grab Tensile Strength Test: • Grab Tensile Strength Test Grips shall be as per many international specifications viz. Indian, British, ASTM etc. and shall be compatible with the universal testing system. • CBR Push Through Test Attachment o Clamp to hold the geotextiles fabric with inner diameter of 15 cm o Standard CBR plunger • The attachment for CBR push through test shall be as per many international specifications viz. Indian, British, ASTM etc. and shall be compatible with the universal testing system. • Puncture Test Attachment o Clamped to hold and obtain an inside dia of 44.45 mm o Hemispherical Plunger • The attachment for puncture test shall be as per modified ASTM D-3787 and shall be compatible with the universal testing system. • The universal testing system shall be complete in all respect and shall be provided with all attachments and its successful demonstration and installation on an angle iron plate form grouted with bolts into the floor in Civil Engineering Department of NIT Hamirpur.

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Chapter 6

Price schedule (To be utilized by bidders for quoting their prices)

Format of FINANCIAL BID(in Separate SEALED cover)

S. No.	Item Description	Make	Model No.	Qty	Unit Rate (Rs)	Amount (Rs)
1						

Taxes etc. (if any)
Total Cost (including taxes etc) in words…….....…….
Delivery:

COMPLETENESS OF SOLUTION: Scope shall not be restricted to the items listed in the schedule or requirement and specifications only. All the items, components and equipments needed to make the complete system functional and secure shall be included in the financial bid submitted by the tenderer.

Annual Maintenance Contract (AMC) Rates

The AMC rates shall be quoted as a percentage of the value of the equipment supplied (excluding Installation, Integration, Testing, Commissioning, labor and manpower charges)

Year	**Rate (%)**
1	Equipment under warranty. No AMC charges
2-4	
5-7	
8-10	

Signature of Tenderer
Seal

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Tel: +91-1972- 304040, 304046.

Chapter 7:
Forms

(1) Acceptance Form
(To be filled and submitted by Bidders)

From
M/s…….. .....……
…….. .....…..
…….. .....…

To
THE FACULTY INCHARGE PURCHASE
National Institute of Technology Hamirpur, Himachal Pradesh-177005

Sir,

I, …….....…… of M/s…….....……
hereby agree to supply to the National Institute of Technology, Hamirpur in accordance with the terms and conditions stipulated in the tender form, the equipment hereunder named of the quality or sort and at the rate or price hereunder specified, on the acceptance on this tender (Ref No .....) by you.

Format of Technical BID(in Separate SEALED cover)

S. No.	**Technical Specs and details**	

Format of FINANCIAL BID(in Separate SEALED cover)

S. No.	**Description**	**Qty**	**Rate**	**Total cost**

Taxes etc.
Total Cost in words…….....……..
Delivery:
We confirm that the quoted prices are firm and inclusive of all taxes and duties (including entry tax, if any), freight and insurance for supply and installation at NIT Hamirpur CAMPUS and training to staff. There would not be any price escalation during the supply period. We also confirm that we will abide by all the terms and conditions and we do not have any counter conditions.

Yours faithfully,
Signature of the Tenderer …….....……. (Seal)
Place …….. Date .....…….

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(2) Deviations from the Detailed Technical Specifications/Conditions of contract

(Please fill separately)

From
M/s…….. .....……
…….. .....….
…….. .....

S. No.	Item (s)	Status of specifications/ Conditions of Contract	Deviations	Remarks (if any)

(Signatures)

Date:
Place:

Name:
Designation:

National Institute of Technology
Hamirpur. (HP) INDIA-177005.
Tel: +91-1972- 304040, 304046.

(3) Compliance Technical Specifications/Conditions of contract

(Please fill separately)

(To be filled and submitted by Bidders)

From
M/s…….. .....……
…….. .....….
…….. .....…

S. No.	Item (s)	Status of specifications/ Conditions of Contract	Compliance	Remarks (if any)

(Signatures)

Date:
Place:

Name:
Designation:

National Institute of Technology
Hamirpur. (HP) INDIA-177005.
Tel: +91-1972- 304040, 304046.

From
M/s…….. .....……
…….. .....…..
……... .....…

UNDERTAKING

- I/We hereby certify that I/We have gone through the clauses and specifications of tender & agree with the terms & conditions contained therein.
- I/We also agree to give performance guarantee as specified and to abide by the scope of the guarantee as prescribed in the tender document.
- I/We agree to operate as per the terms & conditions of the tender.

(Signatures)

Date:
Place:

Name:
Designation: